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Subpart UU—Injection of Carbon Dioxide

SOURCE: 75 FR 75086, Dec. 1, 2010, unless otherwise noted.

§ 98.470 Definition of the source category.

(a) The injection of carbon dioxide (CO₂) source category comprises any well or group of wells that inject a CO₂ stream into the subsurface.

(b) If you report under subpart RR of this part for a well or group of wells, you are not required to report under this subpart for that well or group of wells.

(c) A facility that is subject to this part only because it is subject to subpart UU of this part is not required to report emissions under subpart C of this part or any other subpart listed in § 98.2(a)(1) or (a)(2).

§ 98.471 Reporting threshold.

(a) You must report under this subpart if your facility injects any amount of CO₂ into the subsurface.

(b) For purposes of this subpart, any reference to CO₂ emissions in § 98.2(i) shall mean CO₂ received.

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You must report the mass of CO₂ received.

§ 98.473 Calculating CO₂ received.

(a) You must calculate and report the annual mass of CO₂ received by pipeline using the procedures in paragraphs (a)(1) or (a)(2) of this section and the procedures in paragraph (a)(3) of this section, if applicable.

(1) For a mass flow meter, you must calculate the total annual mass of CO₂ in a CO₂ stream received in metric tons by multiplying the mass flow by the CO₂ concentration in the flow, according to Equation UU-1 of this section. You must collect these data quarterly. Mass flow and concentration data measurements must be made in accordance with § 98.474.

$$\text{CO}_{2\text{T},r} = \sum_{p=1}^4 (Q_{r,p} - S_{r,p}) * C_{\text{CO}_{2,p,r}} \quad (\text{Eq. UU-1})$$

Where:

CO_{2T,r} = Net annual mass of CO₂ received through flow meter r (metric tons).

Q_{r,p} = Quarterly mass flow through a receiving flow meter r in quarter p (metric tons).

S_{r,p} = Quarterly mass flow through a receiving flow meter r that is redelivered to another facility without being injected into your well in quarter p (metric tons).

C_{CO₂,p,r} = Quarterly CO₂ concentration measurement in flow for flow meter r in quarter p (wt. percent CO₂, expressed as a decimal fraction).

p = Quarter of the year.

r = Receiving flow meter.

(2) For a volumetric flow meter, you must calculate the total annual mass of CO₂ in a CO₂ stream received in metric tons by multiplying the volumetric flow at standard conditions by the CO₂ concentration in the flow and the density of CO₂ at standard conditions, according to Equation UU-2 of this section. You must collect these data quarterly. Volumetric flow and concentration data measurements must be made in accordance with § 98.474.

$$\text{CO}_{2\text{T},r} = \sum_{p=1}^4 (Q_{r,p} - S_{r,p}) * D * C_{\text{CO}_{2,p,r}} \quad (\text{Eq. UU-2})$$

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Where:

$CO_{2T,r}$ = Net annual mass of CO_2 received through flow meter r (metric tons).

$Q_{r,p}$ = Quarterly volumetric flow through a receiving flow meter r in quarter p at standard conditions (standard cubic meters).

$S_{r,p}$ = Quarterly volumetric flow through a receiving flow meter r that is redelivered to another facility without being injected into your well in quarter p (standard cubic meters).

D = Density of CO_2 at standard conditions (metric tons per standard cubic meter): 0.0018704.

$C_{CO_2,p,r}$ = Quarterly CO_2 concentration measurement in flow for flow meter r in quarter p (vol. percent CO_2 , expressed as a decimal fraction).

p = Quarter of the year.

r = Receiving flow meter.

(3) If you receive CO_2 through more than one flow meter, you must sum the mass of all CO_2 received in accordance with the procedure specified in Equation UU-3 of this section.

$$CO_2 = \sum_{r=1}^R CO_{2T,r} \quad (\text{Eq. UU-3})$$

Where:

CO_2 = Total net annual mass of CO_2 received (metric tons).

$CO_{2T,r}$ = Net annual mass of CO_2 received (metric tons) as calculated in Equation UU-1 or UU-2 for flow meter r .

r = Receiving flow meter.

(b) You must calculate and report the annual mass of CO_2 received in containers using the procedures specified in either paragraph (b)(1) or (b)(2) of this section.

(1) If you are measuring the mass of contents in a container under the provisions of § 98.474(a)(2)(i), you must calculate the CO_2 received in containers using Equation UU-1 of this section.

Where:

$CO_{2T,r}$ = Annual mass of CO_2 received in containers r (metric tons).

$C_{CO_2,p,r}$ = Quarterly CO_2 concentration measurement of contents in containers r in quarter p (wt. percent CO_2 , expressed as a decimal fraction).

$Q_{r,p}$ = Quarterly mass of contents in containers r in quarter p (metric tons).

$S_{r,p}$ = Quarterly mass of contents in containers r that is redelivered to another facility without being injected into your well in quarter p (standard cubic meters).

p = Quarter of the year.

r = Containers.

(2) If you are measuring the volume of contents in a container under the provisions of § 98.474(a)(2)(ii), you must calculate the CO_2 received in containers using Equation UU-2 of this section.

Where:

$CO_{2T,r}$ = Annual mass of CO_2 received in containers r (metric tons).

$C_{CO_2,p,r}$ = Quarterly CO_2 concentration measurement of contents in containers r in quarter p (vol. percent CO_2 , expressed as a decimal fraction).

$S_{r,p}$ = Quarterly mass of contents in containers r that is redelivered to another facility without being injected into your well in quarter p (standard cubic meters).

$Q_{r,p}$ = Quarterly volume of contents in containers r in quarter p (standard cubic meters).

D = Density of the CO_2 received in containers at standard conditions (metric tons per standard cubic meter): 0.0018682.

p = Quarter of the year.

r = Containers.

§ 98.474 Monitoring and QA/QC requirements.

(a) *CO₂ received.*

(1) You must determine the quarterly flow rate of CO_2 received by pipeline by following the most appropriate of the following procedures:

(i) You may measure flow rate at the receiving custody transfer meter prior to any subsequent processing operations at the facility and collect the flow rate quarterly.

(ii) If you took ownership of the CO_2 in a commercial transaction, you may use the quarterly flow rate data from the sales contract if it is a one-time transaction or from invoices or manifests if it is an ongoing commercial transaction with discrete shipments.

(iii) If you inject CO₂ from a production process unit that is part of your facility, you may use the quarterly CO₂ flow rate that was measured at the equivalent of a custody transfer meter following procedures provided in subpart PP of this part. To be the equivalent of a custody transfer meter, a meter must measure the flow of CO₂ being transported to an injection well to the same degree of accuracy as a meter used for commercial transactions.

(2) You must determine the quarterly mass or volume of contents in all containers if you receive CO₂ in containers by the most appropriate of the following procedures:

(i) You may measure the mass of contents of containers summed quarterly using weigh bills, scales, or load cells.

(ii) You may determine the volume of the contents of containers summed quarterly.

(iii) If you took ownership of the CO₂ in a commercial transaction, you may use the quarterly mass or volume of contents from the sales contract if it is a one-time transaction or from invoices or manifests if it is an ongoing commercial transaction with discrete shipments.

(3) You must determine a quarterly concentration of the CO₂ received that is representative of all CO₂ received in that quarter by following the most appropriate of the following procedures:

(i) You may sample the CO₂ stream at least once per quarter at the point of receipt and measure its CO₂ concentration.

(ii) If you took ownership of the CO₂ in a commercial transaction for which the sales contract was contingent on CO₂ concentration, and if the supplier of the CO₂ sampled the CO₂ stream in a quarter and measured its concentration per the sales contract terms, you may use the CO₂ concentration data from the sales contract for that quarter.

(iii) If you inject CO₂ from a production process unit that is part of your facility, you may report the quarterly CO₂ concentration of the CO₂ stream supplied that was measured following procedures provided in subpart PP of this part as the quarterly CO₂ concentration of the CO₂ stream received.

(4) You must assume that the CO₂ you receive meets the definition of a CO₂ stream unless you can trace it through written records to a source other than a CO₂ stream.

(b) *Measurement devices.*

(1) All flow meters must be operated continuously except as necessary for maintenance and calibration.

(2) You must calibrate all flow meters used to measure quantities reported in § 98.476 according to the calibration and accuracy requirements in § 98.3(i).

(3) You must operate all measurement devices according to one of the following. You may use an appropriate standard method published by a consensus-based standards organization if such a method exists or an industry standard practice. Consensus-based standards organizations include, but are not limited to, the following: ASTM International, the American National Standards Institute (ANSI), the American Gas Association (AGA), the American Society of Mechanical Engineers (ASME), the American Petroleum Institute (API), and the North American Energy Standards Board (NAESB).

(4) You must ensure that any flow meter calibrations performed are National Institute of Standards and Technology (NIST) traceable.

(c) *General.*

(1) If you measure the concentration of any CO₂ quantity for reporting, you must measure according to one of the following. You may use an appropriate standard method published by a consensus-based standards organization if such a method exists or an industry standard practice.

(2) You must convert all measured volumes of CO₂ to the following standard industry temperature and pressure conditions for use in Equations UU–2 of this subpart: standard cubic meters at a temperature of 60 degrees Fahrenheit and at an absolute pressure of 1 atmosphere.

(3) For 2011, you may follow the provisions of § 98.3(d)(1) through (2) for best available monitoring methods rather than follow the monitoring requirements of this section. For purposes of this subpart, any reference to

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the year 2010 in § 98.3(d)(1) through (2) shall mean 2011.

§ 98.475 Procedures for estimating missing data.

A complete record of all measured parameters used in the GHG quantities calculations is required.

(a) Whenever the monitoring procedures for all facilities that used flow meters covered under this subpart cannot be followed to measure flow, the following missing data procedures must be followed:

(1) Another calculation methodology listed in § 98.474(a)(1) must be used if possible.

(2) If another method listed in § 98.474(a)(1) cannot be used, a quarterly flow rate value that is missing must be estimated using a representative flow rate value from the nearest previous time period.

(b) Whenever the monitoring procedures of this subpart cannot be followed to measure quarterly quantity of CO₂ received in containers, the most appropriate of the following missing data procedures must be followed:

(1) Another calculation methodology listed in § 98.474(a)(2) must be used if possible.

(2) If another method listed in § 98.474(a)(2) cannot be used, a quarterly mass or volume that is missing must be estimated using a representative mass or volume from the nearest previous time period.

(c) Whenever the monitoring procedures cannot be followed to measure CO₂ concentration, the following missing data procedures must be followed:

(1) Another calculation methodology listed in § 98.474(a)(3) must be used if possible.

(2) If another method listed in § 98.474(a)(3) cannot be used, a quarterly concentration value that is missing must be estimated using a representative concentration value from the nearest previous time period.

§ 98.476 Data reporting requirements.

If you are subject to this part and report under this subpart, you are not required to report the information in § 98.3(c)(4) for this subpart. In addition to the information required by § 98.3(c)(1) through § 98.3(c)(3) and by

§ 98.3(c)(5) through § 98.3(c)(9), you must report the information listed in this section.

(a) If you receive CO₂ by pipeline, report the following for each receiving flow meter:

(1) The total net mass of CO₂ received (metric tons) annually.

(2) If a volumetric flow meter is used to receive CO₂:

(i) The volumetric flow through a receiving flow meter at standard conditions (in standard cubic meters) in each quarter.

(ii) The volumetric flow through a receiving flow meter that is redelivered to another facility without being injected into your well (in standard cubic meters) in each quarter.

(iii) The CO₂ concentration in the flow (volume percent CO₂ expressed as a decimal fraction) in each quarter.

(3) If a mass flow meter is used to receive CO₂:

(i) The mass flow through a receiving flow meter (in metric tons) in each quarter.

(ii) The mass flow through a receiving flow meter that is redelivered to another facility without being injected into your well (in metric tons) in each quarter.

(iii) The CO₂ concentration in the flow (weight percent CO₂ expressed as a decimal fraction) in each quarter.

(4) The standard or method used to calculate each value in paragraphs (a)(2) through (a)(3) of this section.

(5) The number of times in the reporting year for which substitute data procedures were used to calculate values reported in paragraphs (a)(2) through (a)(3) of this section.

(6) Whether the flow meter is mass or volumetric.

(b) If you receive CO₂ in containers, report:

(1) The mass (in metric tons) or volume at standard conditions (in standard cubic meters) of contents in containers in each quarter.

(2) The concentration of CO₂ of contents in containers (volume or weight percent CO₂ expressed as a decimal fraction) in each quarter.

(3) The mass (in metric tons) or volume (in standard cubic meters) of contents in containers that is redelivered

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to another facility without being injected into your well in each quarter.

(4) The net total mass of CO₂ received (in metric tons) annually.

(5) The standard or method used to calculate each value in paragraphs (b)(1) and (b)(2) of this section.

(6) The number of times in the reporting year for which substitute data procedures were used to calculate values reported in paragraphs (b)(1) and (b)(2) of this section.

(c) If you use more than one receiving flow meter, report the net total mass of CO₂ received (metric tons) through all flow meters annually.

(d) The source of the CO₂ received according to the following categories:

- (1) CO₂ production wells.
- (2) Electric generating unit.
- (3) Ethanol plant.
- (4) Pulp and paper mill.
- (5) Natural gas processing.
- (6) Gasification operations.
- (7) Other anthropogenic source.
- (8) Discontinued enhanced oil and gas recovery project.
- (9) Unknown.

§ 98.477 Records that must be retained.

(a) You must follow the record retention requirements specified by § 98.3(g). In addition to the records required by

§ 98.3(g), you must retain quarterly records of CO₂ received, including mass flow rate or contents of containers (mass or volumetric) at standard conditions and operating conditions, operating temperature and pressure, and concentration of these streams. You must retain all required records for at least 3 years.

(b) You must complete your monitoring plans, as described in § 98.3(g)(5), by April 1 of the year you begin collecting data.

§ 98.478 Definitions.

Except as provided below, all terms used in this subpart have the same meaning given in the Clean Air Act and subpart A of this part.

CO₂ received means the CO₂ stream that you receive to be injected for the first time into a well on your facility that is covered by this subpart. CO₂ received includes, but is not limited to, a CO₂ stream from a production process unit inside your facility and a CO₂ stream that was injected into a well on another facility, removed from a discontinued enhanced oil or natural gas or other production well, and transferred to your facility.

PART 99 [RESERVED]